

Claims

1. A process for cleaning articles in which a vapor produced by heating an active cleaning liquid is brought into contact with articles to be cleaned, characterized in that there is used as active cleaning liquid an azeotropic preparation in the form of a mixture of water and at least one additional component with molecules having hydrophilic and lipophilic groups, the additional component(s) and the water forming an azeotrope during the liquid phase-to-vapor phase transition.

2. A process as described in Claim 1 comprising steps in which

- an azeotropic preparation is prepared with water and at least one component with molecules having hydrophilic and lipophilic groups, in a weight ratio (component(s) having hydrophilic and lipophilic groups) to water of 0.05-99.95 to 99.5-0.05;

- articles to be cleaned are brought at least once into contact with the azeotropic preparation and liquid azeotropic preparation, including impurities removed by the latter, is drained from the articles to be cleaned;

- residues of the azeotropic preparation on or in the articles to be cleaned are removed by evaporation; and

- the vapor of the azeotropic preparation is condensed and the azeotropic preparation recovered by condensation is used for a repeated cleaning step.

3. A process as described in Claim 1 or Claim 2, wherein articles to be cleaned are brought at least once into contact with vapor of the azeotropic preparation and during the contact the

vapor of the azeotropic preparation is allowed to condense on the articles to be cleaned.

4. A process as described in one of Claims 1 to 3, wherein use is made as active cleaning liquid of an azeotropic preparation in the form of a mixture of water and at least one additional component with molecules having hydrophilic and lipophilic groups, the additional component(s) and the water forming an azeotrope during the phase transition from liquid phase to vapor phase and the azeotrope being an azeotrope with an immiscibility gap at a temperature between 0 °C and the temperature of the phase transition from liquid phase to vapor phase under normal pressure, preferably an azeotrope with an immiscibility gap at a temperature in the range from 20 °C and 110 °C under normal pressure.

5. A process as described in one of Claims 1 to 4, wherein use is made, in addition to water, as additional component of the active cleaning liquid, an organic component of the general formula



in which

- R<sup>1</sup> and R<sup>3</sup> each independently represents H; straight-chain or branched, saturated or unsaturated, C<sub>1</sub>- to C<sub>18</sub>- alkyl groups, in which one or more nonadjacent -CH<sub>2</sub>- groups may be replaced by -O-; saturated or unsaturated cyclic C<sub>1</sub>- to C<sub>8</sub>- alkyl groups, in which one or more nonadjacent -CH<sub>2</sub>- groups may be replaced by -O-; hydroxy; C<sub>1</sub>- to C<sub>8</sub>- alkoxy; amino, in which one or both hydrogen(s) may be replaced by C<sub>1</sub>- to C<sub>8</sub>- alkyl groups; and

- X represents -O-; -C(=O); -C(=O)-O-; -NH-, -NR<sup>1</sup>; -N(-OH)-; straight-chain or branched) -C<sub>1</sub>- to C<sub>8</sub>- alkylene groups in which one

or more than adjacent  $-CH_2-$  groups may be replaced by  $-O-$ ; and  $n$  represents integers 1, 2, 3, etc.

6. A process as described in one of Claims 1 to 5, wherein the mixture ratio of water and additional component(s) established in the azeotropic preparation is more or less the ratio present in the vapor resulting from heating of the liquid azeotropic preparation.

7. A process as described in one of Claims 1 to 6, wherein there is added to the active cleaning liquid at least one cleaning booster which does not spontaneously evaporate and/or at least one corrosion proofing additive, preferably at least one cleaning booster which does not spontaneously evaporate, and/or at least one corrosion proofing additive which is distilled with the azeotropic preparation.

8. A process as described in one of Claims 1 to 7, wherein an azeotropic preparation of water and an organic component is used as active cleaning liquid.

9. A process as described in one of Claims 1 to 8, wherein there is used as active cleaning liquid an azeotropic preparation of water and an organic component in relative amounts of  $(100 - x)$  percent by weight :  $x$  percent by weight, where  $x$  is in the range  $0 < x \leq 35$ , preferably in the range  $3 \leq x \leq 25$ , and by special preference in the range  $4 \leq x \leq 15$ .

10. A process as described in one of Claims 1 to 7, wherein there is used as active cleaning liquid an azeotropic preparation of water and two organic components, preferably an azeotropic preparation of water, dipropyleneglycolmono-n-propylether and an additional organic component.

11. A process as described in on of Claims 1 to 10, wherein there is used as active cleaning liquid an azotropic preparation of water, a glycol ether, preferably dipropyleneglycolmono-n-propylether, and an additional organic component in relative amounts of 90 percent by weight:(10 - y) percent by weight:y percent by weight, where y is in the range  $0 < y \leq 5$ , preferably in the range  $0 < y \leq 2$ .

Add  
A1

add B1

add C2

add E67

add H17

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